With these simple ingredients you can whip up a variety of kitchen-tested soups for your photo work.

Kitchen Tested Soups

Simple Developers you can make in the Kitchen.

By Patrick A. Gainer

I believe there are many photographers who feel they would have more fun in the darkroom if they could mix their own processing solutions, but haven't tried it because a decent balance costs money—money that could buy an awful lot of ready-to-mix developer, or a couple of good filters or—you name it. It's about time somebody did something about this situation.

Did you ever see a cookbook that specified weights of solids such as flour and baking powder? They always specify volumes—so many cups, or so many tablespoons. Why not have a cookbook of photographic formulas using volume measures?

Here is how the idea got started. When I got a balance suitable for weighing photographic chemicals, one of the first things I did was to acquire a set of plastic measuring spoons to speed up the weighing process. For example, if I wanted 50 grams of sodium sulfite, I knew I could put two level tablespoons on the pan before I had to start going slow. I soon learned to approximate other chemicals in similar fashion, and the results seemed to be very consistent. But I always brought the weight up to the nearest .1 gram. Then one day, the engineer in me came out and began asking if I really needed to worry about a few tenths of a gram, or if the nearest ⅛ teaspoon wasn't near enough. If I could use only the spoons, it would save time, I could pass on my formulas to friends who didn't have balances, and I could have a private laugh at some other friends who scrupulously weigh everything to the nearest milligram.

Well, you may say, the extreme precision required in photographic work prohibits it. You may get a better perspective on that matter by reading *Developing* by C. I. Jacobson and R. E. Jacobson (Focal Press, April 1970). There are two qualities of a developer that might require high precision of measurement: it should give a particular effect, such as low or high contrast, fine grain, etc., and it should give consistent results from one batch to the next. The first quality actually imposes no great requirement for accuracy when you consider how many different formulas there are which produce the same effect. The second quality, consistency, is of major concern.

Some experiments were in order. I decided to use Kodak D-76 as the basis of these experiments. First, in order to get an idea of how much variation in weight I could expect to get by using volumetric measures, I made 10 weighings of spoonfuls, table- or tea- as seemed appropriate, of each ingredient of Kodak D-76. The results are in Table I.

Then, in order to get an idea of how much deviation I could tolerate from one batch to another without noticeable variation in contrast or other qualities, I made five different batches of M-Q borax developer, one of which was accurately weighed Kodak D-76. The other four were as follows:

MQB-1	MQB-3	MQB-7	MQB-9
Kodak Elon			
½ tsp.	½ tsp.	¾ tsp.	¾ tsp.
Kodak Sodium Sulfite			
4 tbs.	4 tbs.	4 tbs.	4 tbs.
Kodak Hydroquinone			
1½ tsp.	1¾ tsp.	1½ tsp.	1¾ tsp.
20 Mule Team Borax			
¾ tsp.	¾ tsp.	¾ tsp.	¾ tsp.

Water to make 1 qt. of each.
tsp. = level teaspoonful
tbs. = level tablespoonful

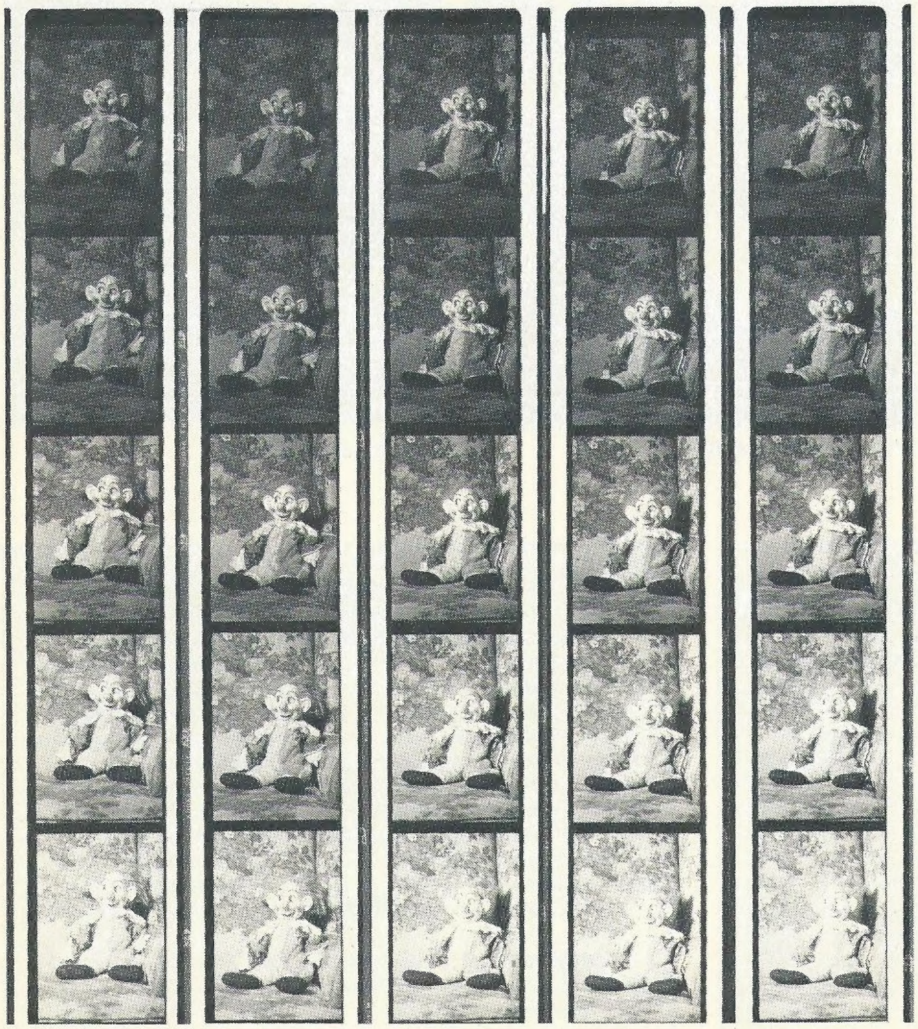
You can see I held sulfite and borax constant (volumetrically) and varied Elon and hydroquinone. None of these would be called D-76 by any scrupulous pictorialist, but I pretended they were all D-76. I made five test strips on Tri-X and developed each one in a different soup (diluted 1:1) using the time-temperature relationship for D-76. What I learned is that from now on I won't weigh out my D-76, nor will I buy it in a can; I'll spoon it out.

Well, D-76 is good clean fun, but most people mix their own soups so they can try things that aren't on the market. Would you like to try divided, or two-bath, developers? The D-23 type gets mentioned quite a bit. Try this recipe:

Solution A

3 cups warm water
2 tsp. Kodak Elon
4 tbs. Kodak Sodium Sulfite
Add water to make 1 qt.

Level spoonfuls are used in mixing formulas in text. Use handle of one spoon to level the chemical in the other.



Tri-X D-76, 1:1 | **Tri-X MQB-1, 1:1** | **Tri-X MQB-3, 1:1** | **Tri-X MQB-7, 1:1** | **Tri-X MQB-9, 1:1**

Contact sheet shows that contrast differences between D-76 and variations are minor over five-stop exposure range.

Solution B
2 tbs. 20 Mule Team Borax per quart of solution. Get it at your supermarket soap counter.

See PhotoGraphic, August, 1972, for some uses of this concoction. I find it has some shortcomings. It is not entirely temperature independent nor time independent, since some development does take place in the first bath. That means also that the first bath can get weaker with use. I tried using D-25 as a first bath, as it is much less active on its own than D-23. Here's the recipe:

Solution A-1
3 cups warm water
2 tsp. Kodak Elon
3 tbs. Kodak Sodium Sulfite
1 tbs. Kodak Sodium Bisulfite
Water to make 1 qt.

Borax, even in saturated solution, is not alkaline enough to serve as an activator bath. This one works well with Tri-X:

Solution B-1
4 tbs. Arm and Hammer washing soda per quart of solution.

Don't laugh. Washing soda is sodium carbonate with some extra water of crystallization (and maybe a little sand); it works fine, it's cheap, and you can get it at the supermarket. If you want to get more exotic, try this one for the second bath:

Solution B-2
2 tbs. Kodalk Balanced Alkali
4 tbs. Kodak Sodium Sulfite
make 1 quart of solution.

You soak your Tri-X film for three minutes in solution A-1, agitating as your conscience moves, but at least enough to avoid air bells. Then you pour that back in the bottle (take your time) and pour in either B-1 or B-2. Agitate vigorously for about 15 seconds at first, then gently for five seconds every minute. At four minutes it's done—rinse, fix and wash.

Solution A-1 can be used until your conscience hurts. The B solutions accumulate developing agents and should be changed every few rolls.

For Plus-X, you may have a lot more contrast than you want. Try solution A-1 with:

Solution B-3
2 tbs. Arm and Hammer washing soda
2 tsp. Arm and Hammer baking soda
to make 1 quart of solution.

Use same times and procedure as before. (There's nothing wrong with baking soda, either.)

Tri-X, D-76, 1:1

Tri-X, MQB-1, 1:1.

Tri-X, MQB-3, 1:1.

Tri-X, MQB-9, 1:1.

Tri-X, Two-Bath, A-2, B-1.

Tri-X, Two-Bath, A-2, B-2.

TABLE I
Weight variations per unit volume of D-76 ingredients, grams.

Ingredient and Unit Sample	Elon tsp.	Hydroquinone tsp.	Sodium Sulfite, tbs.	Borax tsp.
1	3.4	3.0	22.2	2.9
2	3.35	3.0	22.0	2.9
3	3.25	2.9	22.2	2.85
4	3.2	3.05	22.6	2.9
5	3.3	3.1	22.6	2.9
6	3.45	3.0	21.8	3.0
7	3.4	2.9	22.0	2.9
8	3.35	3.0	22.2	2.85
9	3.35	3.05	22.3	2.9
10	3.3	3.1	22.0	2.9
Average	3.34	3.01	22.2	2.9

TABLE II
Approximate weight per unit volume of some commonly used photographic chemicals

Kodak Elon	3.3 grams/teaspoon
Kodak Hydroquinone	3.0 grams/teaspoon
Kodak Sodium Sulfite	22.2 grams/tablespoon
Kodak Sodium Bisulfite	18.0 grams/tablespoon
Kodak Potassium Bromide	8.0 grams/teaspoon
Kodak Potassium Dichromate	7.3 grams/teaspoon
Kodak Potassium Ferricyanide	6.0 grams/teaspoon
Kodak KODALK balanced alkali	5.0 grams/teaspoon
Borax, 20 Mule Team	2.9 grams/teaspoon
Borax Carroll, U.S.P.	3.1 grams/teaspoon
Washing soda, Arm and Hammer.	13.0 grams/tablespoon

1 tablespoon = 3 teaspoons = 1/2 fl. oz.
1 cup = 8 fl. oz. = 16 tablespoons
(All measures are "level.")

Tri-X, MQB-7, 1:1.

Tri-X, "Kitchen DK."

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The above two-bath formulas may not suit some who like snappy negatives, especially when they are used on Tri-X. Here's another recipe:

Solution A-2

3 cups warm water
½ tsp. Kodak Elon
2 tbs. + 2 tsp. Kodak Sod. Sulfite,
1 ½ tsp. Kodak Hydroquinone
1 tbs. + 2 tsp. Kodak Sod. Bisulfite
to make 1 qt. solution

Use same B solutions as with A-1, same times and procedures.

I hope you're having fun.

There are some advantages to storing a single solution developer in two parts, mixing them before use. The activator is in one solution, and everything else is in the other. Storage qualities in partly filled bottles are much better. If you like DK-50 diluted 1:1, try this (I'll just call it "Kitchen DK").

Solution A

¾ tsp. Kodak Elon
4 tsp. Kodak Sod. Sulfite
¾ tsp. Kodak Hydroquinone
to make 1 qt.

Solution B

2 tsp. Kodalk balanced alkali to make 1 qt.

Mix A and B in equal portions just before use. No further dilution needed. Develop Tri-X about four minutes at 70 degrees Fahrenheit. It's not very temperature sensitive, so don't worry about ± 5 degrees Fahrenheit. You probably don't know what contrast index you want any closer than that, anyway. Notice the bromide was omitted. This is okay for one-shot use and gives a little better emulsion speed—about like D-76.

Now how about some paper developers? You'd probably like a standard type like D-72, a warm-tone type like D-52, and maybe a soft type for those single-graded papers. We're going to store them in three containers and still keep the activator separate for better storage. Here they are:

PD-1

3 cups warm water
1 tsp. Elon
2 tbs. Kodak Sodium Sulfite
4 tsp. Kodak Hydroquinone
¼ tsp. Kodak Potassium bromide to make 1 qt.

PD-2

3 cups washing soda per gallon of solution.

PD-3

3 cups warm water
3 tsp. Elon
4 ½ tsp. Kodak Sodium Sulfite
¼ tsp. Kodak Potassium bromide
to make 1 qt.

For a cold-tone developer like D-72, take one part PD-1, one part PD-2 and one part water. This is working strength.

For a warm-tone developer like D-52, take two parts of PD-1, one part of PD-2 and five parts of water. Add bromide to get the warmth of tone you want. You always do that anyway, don't you?

For a soft developer like Agfa 120, take two parts PD-3, one part PD-2 and three parts of water.

Now, so that you can be a little more at ease concocting your own kitchen soups, see Table II for some more weight equivalents.

Remember, your recipes don't have to be exactly like those in the manuals to give equivalent results. You'll have to do some experimenting with development times, but you'd have to do that even if you were one of those masochists who weighs to the nearest microgram. Consistency requires mostly being careful when you level off your spoonfuls, and sticking with one chemical manufacturer so you get the same average particle size.

The proof of these soups is in the negatives and prints. I have tested all of them, some of them many times. For the purpose of demonstrating some of them, I made the test strips which accompany this article. Each strip has exposures ranging from two stops under to two stops over the exposure indicated by an incident light reading with a Luna-Pro meter for the manufacturer's specified film speed. Exposures for the Tri-X negatives were 1/125 second at f/16, f/11, f/8, f/5.6 and f/4.5. See the series of prints for a comparison. The prints were made on Ektamatic SC paper with no filter. I developed the paper in three tbs. washing soda and 1 tbs. sodium sulfite to make one quart of solution. (Also add a pinch or two of potassium bromide).

You should be able to conclude that there is quite a bit of tolerance in the D-76 type of developer.

There are many chemicals I haven't used yet, and there are other brands than those I have used. You can work out your own equivalents by measuring the volume of a whole package of something you want to use. The net weight stamped on the package will usually be pretty accurate. Alternatively, you could use a kitchen scale or postage scale to weigh enough spoonfuls of the material to get a good reading on the scale.

This information should let you have a little more fun and the kind of pictures you want. □